

APPENDIX B – DESIGN FEATURES

Spruce Beetle Epidemic and Aspen Decline Management Response

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Introduction ---

Note: Some design features have been clarified and one has been added as a result of the administrative review of the FEIS.

The design features were developed from laws, regulations, Forest Service Manual or Handbook policy, standard contract language, Forest Service-approved best management practices, or Forest Plan guidelines. These items are considered to be standard management practice as provided by the aforementioned sources, as they have been proven effective during implementation of similar vegetation treatments as proposed in this EIS. These features derive from decades-long practices and/or more recent best available science. These design features translate legal provisions and scientific principles into solid, commonsense stewardship actions that support continued sustainable resource use (USDA Forest Service 2006). They are listed by the functional area from which they arise.

During the implementation of a particular treatment authorized under the EIS, an interdisciplinary team (IDT) would be used to complete required surveys in accordance with Forest Plan and Region 2 policy requirements. The IDT would also complete treatment layout, including treatment units, location of roads, skid trails and landings, and identifying water influence zones. The team would also identify applicable treatment design features that would be applied to the treatment area. If a design feature is relevant to the conditions and/or resources present in the treatment area, the design feature should be applied to avoid or minimize impacts of management actions. Application of the appropriate design feature ensures consistency with analysis completed in the FEIS and demonstrates compliance with legal, policy and Forest Plan requirements. The Pre-Treatment Checklist, Appendix C, would be used to document completed work. Forest Service staff specialists would sign off on completed work before it would be approved by the District Ranger.

Design features would be subject to change as a result of 1) change in policy or management direction (e.g. amendments or revision of the Forest Plan, federal listing of a species, etc.) and 2) best available science which indicates design feature should be modified or replaced to improve effectiveness. Potential changes would be evaluated during annual Management Reviews of SBEADMR implementation.

Some of the design features include more prescribed monitoring during treatment than others, and encompass explicit triggers for adaptive management. These features are marked in bold, below, and repeated in a “Decision-Making Triggers for Adaptive Implementation” table in Chapter 2.

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Identifier	Design Feature	Source / Citation
Air Quality Objectives: Comply with Clean Air Act requirements.		
AQ-1	Prescribed burning operations will comply with the State of Colorado air quality regulations.	Clean Air Act
(TSHR-7)	Use suitable road surface stabilization practices and dust abatement supplements on roads with high or heavy traffic use (See FSH 7709.56 and FSH 7709.59).	FS National BMPs
Cultural Resources Objectives: The following Cultural Resources Design Features derived from the Programmatic Agreement will be implemented for Alternatives 2 and 3. If these standard treatments are followed as described, the proposed treatment will have no direct or indirect effects on cultural resources. Furthermore, under the S.106 Notification consultation with the Colorado State Historic Preservation Officer, SBEADMR will have no adverse effect on historic properties (Claeyssens 2014).		
CR-1	Cultural resource surveys will occur prior to treatment implementation. All sites within a treatment area will be avoided until State Historic Preservation Office consultation may be completed. Archaeologist will consult with timber personnel with regards to site locations	USDA Forest Service, 2015. - Programmatic Agreement for Bark Beetle, Hazardous Fuel and Tree Reduction Programs with Amendments
CR-2	Discoveries: If any new cultural resource sites are discovered during implementation, treatment activities would stop and the Forest Service archeologist would be contacted immediately. The archaeologist will evaluate the significance of the cultural resource. If potentially significant, within 48 hours of the discovery, the SHPO will be notified of the discovery and consultation will begin to determine an appropriate mitigation measure. The discovery will be protected from further disturbance until any required mitigation is completed. Operations may resume at the discovery site upon receipt of written instructions and authorization by agency officials.	USDA Forest Service, 2015. - Programmatic Agreement for Bark Beetle, Hazardous Fuel and Tree Reduction Programs with Amendments.
CR-3	For all cultural resource sites located during the field inventory or previously known, no mechanical treatment or ground disturbing activities will occur within the site boundary, including an additional 50 foot buffer around the site. If mechanical treatments are necessary, the site and the 50 foot buffer around the site will be treated by hand to remove hazard trees and accumulated fuel build up.	Stipulation 5.B.b. ii and Stipulation 6.a and 6.b, Standard Treatments for Historic Properties, in the 2015 Programmatic Agreement for Bark Beetle, Hazardous Fuel and Tree Reduction Programs

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CR-4	In areas slated for prescribed fire treatment, flammable cultural resource sites or sites with components or features susceptible to heat damage with the APE will be marked on the ground by an archeologist, along with a buffer area of no less than 50 feet, sufficient to prevent fire or heat from affecting components of the site that may contribute to its eligibility to the National Register of Historic Places. In addition, treatments may include fuel-breaks, no-treatment buffers, wrapping, foaming, wetting, blackline, fire line (hand or mechanical), and clearing the cultural resource sites of flammable debris by raking and hand removal. Any fire line that will be ground disturbing will be subjected to an intensive field inventory; if any additional sites, components or features are located, the fire line will be adjusted to avoid these cultural resources.	USDA Forest Service, 2015
CR-5	If road construction cannot physically be relocated to avoid a site, and there is the potential for unidentified buried cultural remains, then SHPO consultation will take place and construction activities in the site boundaries would be monitored by an archaeologist.	USDA Forest Service, 2015
CR-6	Culturally Scarred Trees (CSTs) will be protected during mechanical treatments and to the extent possible, during underburns. Hand removal of fuels under CSTs will be conducted to the extent possible to reduce the risk of killing them during prescribed burning. However, no measures will be taken to create firelines or physically prevent burning around the CSTs.	USDA Forest Service, 2015
CR-7	Post-Treatment Monitoring: For treatments where field inventories are not feasible due to visibility concerns prior to treatment implementation, monitoring in the form of a sample inventory for cultural resources will be required post implementation. This monitoring will take place within one year of treatment implementation, with results provided to SHPO.	USDA Forest Service, 2015
CR-8	Post-Treatment Monitoring: Cultural resource sites that were required to be avoided during treatment implementation will be monitored for effectiveness of the protection measures following treatment completion.	USDA Forest Service, 2015
CR-9	Native American human remains: Any operator carrying out treatments must notify the Forest Service, by telephone, with written confirmation, immediately upon the discovery of human remains or funerary items, discovered on federal land. The Forest Service must then immediately notify appropriate tribes of the find. All treatment activities must stop in the vicinity of the discovery that could adversely affect it, until tribal consultation can be completed and a Plan of Action can be approved and implemented	NAGRPA regulation 43 CFR 10.4(g)
Forest Service Sensitive Plants Objectives: <ol style="list-style-type: none"> 1. For Upland (non-wetland) Sensitive Species: Minimize impacts to individuals or populations that would lead to a loss in viability. 2. For all Sensitive Species: Minimize impacts to individuals or populations that would contribute to a loss in viability. 3. For Fen Sensitive Species*: <ol style="list-style-type: none"> a. Reduce potential for treatment-related resource damage to fens. b. Maintain fen hydrologic function (soil compaction, water diversion, dewatering) that would reduce suitability or sustainability of rare fen habitat. c. Prevent sedimentation events that would reduce or impair wetland functions. 		

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<p>4. For <i>Astragalus leptaleus</i>: Maintain functions of riparian wet or moist meadows.</p> <p><i>*Carex diandra, Drosera rotundifolia,, E. chamissonis, E. gracile, Kobresia simpliciuscula, Salix candida, Sphagnum angustifolium, Utricularia minor</i></p>		
Identifier	Design Features	Source / Citation
FSSP-2	<p>All Sensitive Species</p> <p>A - During prescribed fire operations (including aerial or ground broadcast burning), ignitions and other fuel treatment activities would be located away from sensitive plant species occurrences and wetlands.</p> <p>B - Dust abatement (use of MgCl₂ or CaCl₂) will avoid sensitive species occurrences and wetlands by 500 feet.</p> <p>C - Avoid sensitive species occurrences and wetlands with chemical weed treatments.</p> <p>E - Any Region 2 sensitive plant species new to list or located after contract or permit issuance will be appropriately managed by active coordination between permittee, contractor or purchaser, Contracting Officer, and Forest Service line officer, treatment administrator, and botanist.</p> <p>F - Surveys will occur prior to implementation; Botanist will communicate with timber staff the location of any sensitive species found</p>	Elliott and others 2011, treatment- specific design
FSSP-3	<p><i>Machaeranthera coloradoensis</i></p> <p>A - Minimize use of roads passing through known sensitive species sites.</p>	Elliott and others 2011, treatment- specific design
FSSP-4	<p><i>B. paradoxum</i></p> <p>B - If there is tree canopy covering habitat, maintain pre-treatment tree canopy over habitat.</p>	Elliott and others 2011, treatment- specific design
FSSP-6	<p>Fen sensitive species*</p> <p>A - Keep roads and trails out of wetlands and their water influence zones (WIZ). (1)B - Restore existing disturbed areas that are eroding and contributing sediment to the wetland.</p> <p>(WQSP-2) – No mechanical equipment will be used within 100 feet of the edge of a fen.</p>	<p>(1) USDA Forest Service 2006.</p> <p>(2) USDA Forest Service 2006, 2012.</p>
FSSP-7	<p>Fen sensitive species*</p> <p>A – Treatment activities will avoid wetlands (see WQSP-6A)</p> <p>B – Mechanical treatment and vehicle use will occur outside of wetlands or their water influence zones.</p> <p>C- Prevent mineral sediment deposition from occurring in wetlands. (3)</p>	(3) USDA Forest Service 2012, Austin 2008.
FSSP-8	<p>Fen sensitive species*</p> <p>A - Develop an erosion and sediment control plan to avoid or minimize downstream impacts using measures appropriate to the site and the proposed activity. (3)</p> <p>B - Conduct prescribed fires to minimize the residence time on the soil while meeting the burn objectives. This is usually done when the soil and duff are moist.</p> <p>C - Limit roads and other disturbed sites to the minimum feasible number, width, and total length. Minimize sediment discharge into streams, lakes, & wetlands during construction and stabilize & maintain disturbed sites to control erosion. (1)</p> <p>D - Maintain sufficient upslope ground cover to prevent sediment movement downward into wetland.</p>	<p>1) USDA Forest Service 2006.</p> <p>(3) USDA Forest Service 2012, Austin 2008.</p>

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FSSP-9	<p><i>Astragalus leptaleus</i></p> <p>A - Avoid treatment activities and equipment use in wet or moist meadows.</p> <p>B - Design stream crossings at armored points, or armor them to prevent loss of functions in wet or moist meadows.</p>	Elliott and others 2011, treatment- specific design
FSSP-10	<p>Upland (non-wetland) sensitive species</p> <p>A- Sensitive plant populations will be flagged and avoided for all ground disturbing activities with a buffer of 20 – 100 feet (as determined during treatment surveys).</p> <p>B- Proposed road construction, reconstruction, landings and staging areas in potential habitat for sensitive species will be designed and marked on the ground only after the areas have been surveyed by a qualified botanist in the proper season.</p>	Professional judgment
<p>Invasive Weeds</p> <p>Objective:</p> <p>Prevent new introductions of invasive exotic plants (Invasive Weeds) or spread of existing infestations.</p>		
IW-1	A - Consider excluding areas from prescribed burning where there are infestations of fire-proliferating species (example, cheatgrass).	
IW-2	<p>Practices - Prevent the accidental spread of invasive species carried by contaminated vehicles, equipment, personnel, or materials. (2)</p> <p>A - Establish and implement standards and requirements for vehicle and equipment cleaning to prevent the accidental spread of aquatic and terrestrial invasive species on the treatment area. (1) Use standard timber sale contract provision BT 6.35 to ensure appropriate equipment cleaning. Equipment cleaning should be conducted after working in areas with known infestations, and prior to bringing equipment onto the National Forest.</p> <p>B - Locate and use weed- free treatment staging areas. Avoid or minimize all types of travel through weed- infested areas. (3)</p> <p>C - All imported materials (erosion control materials, soil, gravel, etc.) should be from a “weed-free” source or area.(3)</p> <p>D - Monitoring will occur where imported materials have been placed to ensure no new infestations have been established.</p>	<p>(1) Noxious weeds, that appear on the State of Colorado’s noxious weed list (Colorado 2013)</p> <p>(2) FSM 2900.</p> <p>(3) USDA Forest Service 2001.</p>
IW-3	<p>Practices - Retain native vegetation to the extent possible to prevent weed germination and establishment, in and around activity area and keep soil disturbance to a minimum. (3)</p> <p>A – Contracts will require timber purchasers and contractors will re-seed disturbed areas (as designated by the Forest Service) with an appropriate certified weed-free native seed mix to avoid introduction of nonnative invasive plants and promote re-vegetation of native species.</p> <p>B - Throughout the implementation period of the proposed action, the Forest Service should maintain flexibility to defer cut units or stands within priority areas from treatment due to the discovery of significant new invasive plant populations with potential to disrupt the functioning of native plant communities.</p> <p>C - Where fuel reduction, timber harvest and other resource objectives necessitate ground disturbance and soil exposure, or substantial ground cover and canopy removal, include appropriate re-vegetation or invasive plant management strategies in treatment plan. (4) Where necessary, rehabilitate/restore or treat disturbed areas after management activities and conduct follow up monitoring on these areas susceptible to invasive plant spread. (4)</p> <p>D – In areas of high risk for invasive weeds spread, rehabilitate/restore or treat disturbed areas after fuel management activities and conduct follow up monitoring to minimize invasive plant spread. (4)</p>	<p>(3) USDA Forest Service 2001.</p> <p>(4) Cal-IPC Land Management BMPs. 2012</p>

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	<p>E - Cover and reduce exposure of bare ground. Use on-site chipping or treated fuels from mastication to cover bare soil to prevent seed establishment where appropriate. (4) See SV-4 concerning areas where mineral soil exposure would be needed to assist with natural regeneration.</p> <p>F- Slash and burn piles will be located away from known invasive weed populations and will be assessed for restoration and revegetation needs.</p>	
IW-4	<p>Practices - Control and treat existing infestations to prevent treatment-associated spread and proliferation.</p> <p>A - Coordinate treatment activities with any nearby herbicide application to maximize cost effectiveness of nonnative invasive plant treatments. (3)</p> <p>B - Treatment of invasive weeds will follow Forest Service policy regarding certification of applicators and reporting of data to Forest Service data bases.</p> <p>C - Treatments of invasive weeds will follow the District Noxious Weed Treatment Decision Notice.</p> <p>D - Populations of noxious weeds should be aggressively treated with the appropriate management tools. This may include treatment with herbicides, grazing, cultural, and biological methods, consistent with the GMUG district decision notices.</p>	(3) USDA Forest Service 2001.
IW-5	Within high risk areas for invasive weed species, complete inventories to identify invasive weed populations. Treat and document at least 50% efficacy rate prior to treatment and/or road-building.	USDA Forest Service, Region 2. 2015.
IW-6	<p>Practices - Monitor project area for new infestations and to assess efficacy of treatments.</p> <p>A - Inspect and document all limited term ground-disturbing operations in infested areas for at least three growing seasons following completion of the project. For on-going projects, continue to monitor until reasonable certainty is obtained that no new infestations have occurred. Provide for follow-up treatments based on inspection results.</p> <p>B - Consider modifying design feature implementation for future project implementation based on considerations such as efficacy, cost, and other unforeseen impacts.</p> <p>C - Consider including other best practices for treatment-specific considerations.</p>	Invasive Plant Data: The Rocky Mountain Region's Approach to Mapping and Recording Inventory and Treatment Data. October 2015.
<p>Lands</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. Avoid impacts to existing infrastructure from treatment activities. 2. Ensure treatments near electric infrastructure are conducted safely. 		
L-1	Mechanical treatments used to remove dead and dying vegetation shall utilize equipment or operating techniques to ensure that debris cannot be thrown into electrical facilities causing damage or safety hazards.	Professional judgment
L-2	Coordinate prescribed fire treatment activities with utility ROW holders to ensure that facilities are not damaged by a fire that burns too hot or generates smoke dense enough to disrupt the transmission of electricity.	Professional judgment
L-3	When conducting hand treatments near energized facilities, non-electrical workers will observe the minimum approach distance.	Occupational Safety and Health Administration regulations provided in 29 CFR §1910.333.

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L-4	Public Land Survey System corner preservation should be performed before any active or land disturbing management activity. This would include all known survey monuments, section corners, and other corner accessories.	Reference FSM 7150 and Timber Sales Contract Division BT BT6.23
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Range Objectives: <ol style="list-style-type: none"> 1. Eliminate conflicts between implementation activities and range activities, or mitigate for them. 2. Revegetate sites disturbed during implementation. 		
RG-1	<p>Coordinate with District Rangeland Management Specialists prior to developing sale and/or service contracts and/or burn plans to identify and mitigate any potential direct conflicts during implementation.</p> <p>Range personnel will be responsible for incorporating mitigation measures into grazing permittees' Annual Operating Instructions (for example, a pasture needs to be grazed earlier/later to avoid direct temporal overlap with timber sale activities).</p>	GMUG Forest Plan
RG-2	Coordinate with District Rangeland Management Specialists prior to treatment to determine whether or not grazing deferment or pasture rest is needed, when deferment or rest is needed (prior to or following treatment), and for how long.	USDA FS. Rocky Mountain Region. 1996.
(IW-5)	Re-seeding: See IW-5.	
Recreation Objectives: <ol style="list-style-type: none"> 1. Coordinate potential conflicts between timing of treatment implementation and recreation use. 2. Seek opportunities to design treatments to benefit recreation residences, lodges, and organization camps in the vicinity of planned treatments. 		
REC-1	Avoid use of broadcast burning treatments in campgrounds (if piles are burned, ensure that impacts to residual trees are negligible).	Professional judgment, standard operating procedure
REC-2	<p>Developed recreation sites:</p> <p>Managed by concessionaire: plans need to consider impact to summer operating season and should minimize impacts to operations as much as possible.</p> <p>For Forest Service operated sites: coordinate with District to address any District concerns regarding impact to the operating season.</p>	Professional judgment, standard operating procedure
REC-3	Coordinate with District recreation staff regarding any treatment-related closures for developed recreation sites, dispersed recreation sites, trails and roads.	Professional judgment, standard operating procedure

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REC-4	<p>Special Uses: Work with recreation residences, lodges and organization camps to design treatments adjacent to these tracts to also treat these tracts to the extent feasible.</p> <p>Coordinate with District recreation staff to address treatment-related impacts to special use permit holders in the treatment area.</p>	Professional judgment, standard operating procedure
REC - 5	For treatments in ski areas, coordinate with the permit administer for these areas to define the vegetation management in the ski areas.	Professional judgment, standard operating procedure
REC - 6	For all treatments, coordinate with District recreation staff to address treatment-related impacts to special use permit holders in the treatment area.	Professional judgment, standard operating procedure
REC - 7	For all treatments, for treatments within ¼ mile of Wilderness boundaries, ensure that Wilderness boundaries are clearly marked by cadastral grade survey or set treatment boundaries at least 300 feet from boundaries located with resource grade GPS using standard parameters for assurance of accuracy. Treatments must not enter wilderness.	Professional judgment, standard operating procedure
REC-8	For treatments that occur in winter or impact winter recreation access or use routes, coordinate with District recreation staff to address treatment-related impacts to winter uses, many of which are managed in partnership with clubs or other organizations.	Professional judgment, standard operating procedure
REC-9	<p>When timber harvest activities preclude use of a nearby trail: a) notify the public; b) consider identifying timeframes for safe travel on the trail; and c) if harvest is expected to preclude use for more than one season and a detour is feasible, provide a detour.</p> <p>For the CDNST, actions that allow continued use of the trail (or a detour) should be given higher consideration due to the national prominence of the trail.</p>	Professional judgment, standard operating procedure

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Scenic Quality and Visual Resources

Objectives:

VQOs of Preservation (P) – only ecological changes are allowed. Management activities, except for very low visual-impact recreation facilities, are prohibited. This objective applies to Wilderness areas, primitive areas, other special classified areas, areas awaiting classification and some unique management units which do not justify special classification.

VQOs of Retention (R) – management activities must not be visually evident. They may only repeat form, line, color and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be evident. Immediate reductions of contrast should be accomplished by means such as seeding vegetative clearing and cut-and-fill slopes, hand planting of large stock, painting structures, etc.

VQOs of Partial Retention (PR) – management activities must remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color or texture common to the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape. Actions may also introduce form, line, color, or texture which are found infrequently or not at all in the characteristic landscape, but should remain subordinate to the visual strength of the characteristic landscape. Reduction of contrast in form, line, color and texture to meet partial retention should be accomplished as soon as possible or within a year minimum.

VQOs of Modification (M) – management activities may visually dominate the original characteristic landscape. However, activities of vegetative and landform alteration must borrow from naturally established form, line, color or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Activities are predominantly introduction of facilities such as buildings, signs, roads, etc. Reduction of contrast (or compliance with regional guidelines) should be accomplished in the first year.

VQOs of Maximum Modification (MM) – management activities may dominate the original characteristic landscape. However, when viewed as a background, the visual characteristics must be those of natural occurrences within the surrounding area or characteristic type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color or texture. Alterations may also be out of scale or contain details incongruent with natural occurrences as seen in the foreground or middle ground. Activities are typically additional part of structures, roads, slash and root wads must be subordinate to proposed composition as viewed in the background. Reduction of contrast should be accomplished within five years.

Volume Two, Chapter 1: The Visual Management System, National Forest Landscape Management, Handbook 462, (Big Eye Book) pp 29 -- 37, .pdf, 4.08 MB

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SVR-1	<p>For all treatments, if VQO maps are not locatable, the following VQO's will be used as interpreted from the 1991 LRMP. These will be applied to the Visual Management Guideline Classes identified in the Visual Resource Management Section discussed below. These requirements apply to vegetation treatments.</p> <p>1A – Retention 1B - Modification, but Retain where possible 1D – Modification or Max. Modification 2A – Retention 2B – Partial Retention 3A - Retention 4B – Modification 4D – Modification 5A – Modification 5B – Modification 6A – Modification 6B – Modification 7A – Modification or Max. Modification 10E – Modification</p> <p>Other Management Areas are not planned for treatment. See other requirements for Sensitivity Level 1 Roads, Trails and View Points below. Those requirements are more restrictive than the general management area requirements shown here.</p>	LRMP.
SVR-2	<p>In all treatment areas, follow General Direction and associated standards and guidelines in the Visual Resource Management Section of the 1991 Land and Resource Management plan. This direction is found on pages III-12 through III-15.</p> <p>Consult with the forest visual resource specialist when implementing projects to ensure that these standards are being met. The visual resource specialist will adapt this direction to the situations where the forest has been heavily impacted with dead or dying trees. The visual system was not designed for these situation, however the principles are to be applied.</p>	LRMP.
SVR-3	<p>In developed recreation sites, including trailheads and administrative sites (typically Visual Quality Objectives [VQOs] of Modification or Maximum Modification), cut stumps as low to the ground as feasible.</p> <p>Remove or chip slash at developed campgrounds or designated recreation areas, extending outwards 200 feet of any constructed feature; at designated dispersed sites; and other dispersed sites deemed important at the time of implementation.</p> <p>Alternatively, at designated dispersed sites or other dispersed sites deemed important and at developed recreation sites (except developed campgrounds or designated recreation areas) and at administrative sites, move heavy slash to designated slash piles and burn as soon as conditions allow.</p> <p>Note: designated recreation areas include but are not limited to: Taylor Canyon, Mesa Lakes, Island Lake, and Amphitheatre/Na-Gach.</p>	LRMP

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SVR-4	In developed recreation and administrative sites (typically VQOs of Modification or Maximum Modification), minimize damage from mechanical treatments to young healthy trees and understory trees and shrubs.	LRMP
SVR-5	In areas of Retention or Partial Retention, minimize damage to natural features such as rock outcrops, young healthy trees and understory of trees and shrubs; cut stumps as low to the ground as feasible. Note: Retention and Partial Retention will be applied to National Recreation Trails, National Scenic Trails, National Historic Trails and State or Forest Service Scenic Byways/All-American Roads. If additional potential reroutes of the CDNST are identified for consideration in agency planning documents, this design feature will be applied to those potential reroutes.	LRMP
SVR-6	For all designated trails (NRT, NST and NHT) and scenic byways and sensitivity level 1 roads or trails, the VQO is Retention for the foreground of these areas. The VQO is Partial Retention for the middle ground of these areas. Design treatments based on the VQO. When cutting trees that fall across trails or within the trail corridor (generally 3 feet on either side of the trail), lop and scatter logs and limbs outside the corridor. Cut stumps flush with the ground in the immediate (to 300 feet) foreground of these travel ways. Remove heavy slash (greater than 1 foot deep) within the immediate foreground (to 300 feet) to slash piles (which will be burned or are expected to be minimally apparent within 5 years) or chip. Slash may be scattered to depths of less than 1 foot. Do not use these routes for skidding. Minimize skid trails across these features. Rehabilitate any skid trails or temporary roads that intersect with these features or are present in the foreground (up to ½ mile). Do not locate landings along or within the immediate foreground (to 300 feet) of these travel ways. In the LuJan-LaGarita area of the proposed reroutes for the CDNST, the center-line of all of the proposed reroutes shown in this document will be marked prior to treatment. Until a decision is made to adopt a specific reroute, the VQOs in the foreground and middle ground of each such center-line will be maintained during treatment, consistent with management for an existing segment of the CDNST. The Design Features discussed above will also be employed on the proposed reroutes of the CDNST included in the FEIS. If additional potential reroutes of the CDNST are identified for consideration in agency planning documents, this design feature will be applied to those potential reroutes.	LRMP
SVR-7	For all treatments, revegetate and till disturbed and compacted soils on landings, burned slash pile sites, skid trails and temporary roads with native seed mixture after the completion of treatments. Block access to decommissioned or re-claimed temporary roads with naturalistic barriers.	LRMP.
Silviculture		

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Objectives: 1. For spruce beetle-affected stands: a. Provide for salvage of dead or dying stands b. Maintenance of green stands where they exist c. Regenerate stands where needed. 2. For stands to be treated for aspen decline: a. Regeneration of aspen before advanced decline, by either fire or mechanical removal b. Increase landscape resilience of aspen by ensuring that there are significant patches of young aspen c. Provide for aspen establishment 3. Shift toward drought tolerant early seral species where appropriate.		
SV-1	All regeneration cutting will meet stocking standards as defined in the Forest Plan.	GMUG Forest Plan
SV-2	All vegetation treatments, including prescribed fire, will be prescribed by a U.S. Forest Service, Region 2, Certified Silviculturist in accordance with applicable guidance from other resource specialists.	FSH 2409.17 Silvicultural Practices handbook
SV-3	To the greatest degree practicable given site fuels conditions, jackpot and pile burning would be used as acceptable methods to assist with natural regeneration strategies and to create mineral soil seedbeds for natural regeneration. Harvested areas would be evaluated for stocking.	R-2 FSH 2409.17 Silvicultural Practices Handbook
SV-4	<p>During site preparation or piling activities, mineral soil exposure will be less than 40% of the treated area. Soil cover should be retained when practicable.</p> <p>To assist natural regeneration, conduct vegetation and fuels management activities to average 20 - 40% mineral soil exposure in post-harvest, as prescribed in the stand management prescription. On south slopes, mineral soil exposure would be less so that site moisture can better be retained.</p> <p>If the area has been identified as being high risk for invasive plants, or is known to have existing infestations, reduce soil exposure and consider artificial regeneration practices (planting). Also see IW-3.</p>	Alexander 1987
SV-5	In order to reduce the risk of spruce beetles being drawn to uninfected trees, in stands with a component of live spruce which are not beetle-infected, felled spruce shall be removed from the sale area by no later than October 31 of the year following felling. Unutilized and un-merchantable spruce material (in excess of the 10-20 tons/acre required by the Forest Plan) that is cut during operations and greater than 6" diameter at the small end could be removed from the stand and taken to the landing. This will be considered yarding of un-merchantable material (YUM). When removal of non-merchantable material (YUM) is operationally infeasible, material would be debarked in stands, chipped or otherwise treated within the stand to reduce the likelihood of the material being utilized as brood material. Treatment of non-merchantable material will be prescribed by a certified silviculturists, with the overall goal to reduce brood material.	Professional judgment of GMUG silviculturists and Forest Health Protection Staff.
SV-6	During any types of harvest in spruce-fir, areas of advanced regeneration will avoided to the greatest degree practicable while allowing feasible operations.	Professional judgment and standard operating procedure used by GMUG silviculturists.

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SV-7	Broadcast burning for regeneration of spruce-fir stands should be limited to salvage operations in single-story stands with almost total spruce mortality; such stands have limited/no advanced regeneration. Targets for broadcast burning for regeneration in salvage-harvested, single-story spruce-fir stands would be creating patches of exposed mineral soil in up to 40% of the area to allow for spruce seed establishment mixed with some large residual material to provide shade to seedlings and seed sources within 300 feet of a majority of the unit. If the area has been identified as being high risk for invasive weeds, or is known to have existing infestations, reduce bare mineral soil exposure and consider artificial regeneration practices (planting).	Professional judgment of GMUG silviculturists; Fire Effects Information System; Kilgore and Curtis 1987.
SV-8	In stands managed for aspen regeneration: a. Treatment units > 20 acres are preferred, to lessen effects of big game and livestock browsing. b. Minimize soil compaction by heavy equipment and haul trucks. c. Confine aspen treatments to suitable soils as much as possible. d. Use clear-felling (with fire as appropriate) to regenerate aspen stands for increased landscape resilience e. Choose timing of treatments, appropriate to recent extreme weather events.	Johnston 2001, Worrall 2013, Worrall et al. 2013
(RG-2)	Coordinate with District Rangeland Management Specialists prior to treatment to determine whether or not grazing deferment or pasture rest is needed, when deferment or rest is needed (prior to or following treatment), and for how long.	Professional judgment of GMUG silviculturists and rangeland management specialist.
(SP-1)	If the treatment unit is <100 acres and not near infrastructure or in management areas 1A, 1B or 1D, and aspen regeneration is the main goal, slash may be left on the ground to deter elk browse of aspen seedlings.	Professional judgment and standard operating procedure used by GMUG fuels managers.
Slash Piles Objectives: 1. Use current science and silvicultural, fuels and fire management practices to achieve an optimum balance between positive and negative effects of slash treatment on soils, hydrology, wildlife and potential fire risk. 2. Reduce negative impacts of fires.		
SP-1	If the treatment unit is <100 acres and not near infrastructure or in management areas 1A, 1B or 1D, and aspen regeneration is the main goal, slash may be left on the ground to deter elk browse of aspen seedlings.	Professional judgment and standard operating procedure used by GMUG fuels managers.
SP-2	A minimum and maximum fuel loading will be specified in association with harvests and fuels treatments. Generate associated Brush and Disposal (BD) plan. This minimum and maximum will include any needs to reduce fuels near infrastructure and leave material onsite for seedling establishment, wildlife benefit and soils health.	Standard operating procedure used by GMUG silviculturists and fuel managers.
SP-3	In Management Areas 1A, 1B and 1D, (developed recreations sites, ski areas, utility corridors) enough harvest/activity-generated fuels will be removed so that residual fuel loading produce less than four foot flame lengths under 90% burning conditions . Slash piles will be burned by the Forest Service in accordance with agency protocols.	1991 Forest Plan Amendment, 8224GM, p III-91, III-95, III-99 and

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		standard operating procedure used by GMUG silviculturists.
SP-4	While recognizing the high variability of treatment unit conditions and prescriptions, slash piling should be limited as follows to minimize impacts to soils: slash piles at landings should generally be limited to 1500 square feet or less. After landing piles are burned, rehabilitate burned area by scarification. Interior piles should generally be limited to 400 square feet or less. Minimize the placement of green material exceeding 8’’ in diameter in piles. Strive to keep the total area covered by piles to 5 percent or less of the treatment area. Minimize inclusion of topsoil into piles. Place piles sufficiently away from leave trees to protect trees from damage during burning.	Professional judgment and standard operating procedure used by GMUG silviculturists and fuels managers.
SP-5	In areas treated for recovery where beetle kill is prominent, piles will be burned as soon as burn conditions for pile burning occur (usually first adequate snowfall event). Where possible, piles should be located in proximity to roads that prescribed burn personnel can reach the site either by motorized vehicle (truck, UTV, ATV, or snowmobile) or by foot without having to hike or ski more than ¼ to ½ mile to reach the piles.	Professional judgment and standard operating procedure used by GMUG silviculturist and fuels managers.
SP-6	Activity-generated fuels would be reduced in compliance with the treatment Brush and Disposal (BD) plan. Fuels, silviculture and timber resources management personnel would develop prescriptions considering economical harvest methods, activity fuels and residual site conditions.	FSH 2409.19
SP-7	Slash piles should not be located within 2 tree lengths of the tallest residual snags or groups of snags in salvage treatments or within 2 tree lengths of the perimeters of salvage units. If possible this design feature should be applied to resiliency treatments as well, though due to smaller size and higher percentage of live canopy in resiliency treatments, it may be less applicable.	Safety requirement for firefighters burning slash piles during better dispersion (i.e., windy) conditions.
SP-8	Monitor a sample of pile burn scars for bare soil and— on scars located on slopes and in swales—for the presence of rills, gullyng, or soil movement. If >100 sq ft of burn scar consisting of bare soil; minor rilling or gullyng present within or adjacent to burn scar; minor deposition of soil downslope of scar, treatment bare soil and erosion according to District protocols, which may include one or two of the following: addition of mulching, scarification, inoculation with adjacent soils, seeding, etc. If monitoring reveals >200 sq ft of burn scar consisting of bare soil; multiple rills, or gullyng, or gullyng 2-3" deep within burn scar; significant deposition of soil downslope of scar, elevate treatment application. (A decision-making trigger identified in Chapter 2).	Professional judgment; SBEADMR-specific monitoring component
Transportation System and Haul Routes Objectives: Manage travel management effectively to provide resource protection and a safe, environmentally sound, and efficient transportation system.		
TSHR-1	Existing roads will be used for equipment access to the extent road location and condition permit reasonable access. Implementation of mechanical treatments and harvests will attempt to minimize road construction whenever possible.	USDA Forest Service, 2006. Conservation Practices Handbook and treatment-specific design

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TSHR-2	<p>New Access Roads: Where terrain, road length, and other resource risks exist, a “Designed Road” shall be utilized for Treatment access. Designed Roads would be surveyed, designed, and administered by the Forest Service engineering department.</p> <p>Temporary roads may be used where a designed road is not needed, as determined by the Forest Service. The location and clearing widths of all Temporary Roads or facilities shall be agreed to in writing (between the Forest Service and the contractor) before construction is started.</p> <p>Following use for harvest and treatment implementation, both temporary AND designed roads will be decommissioned, which involves re-contouring where significant side slope exists, elimination of ditches and other structures, out-sloping during construction, removal of ruts and berms, effectively blocking the road to normal vehicular traffic where feasible, and construction of drainage features such as cross ditches and water bars. Invasive species monitoring will occur after road decommissioning and will be followed by weed treatments where needed. Effectiveness of road closure will also be monitored.</p>	<p>Treatment-specific design</p> <p>Timber Sale Contract Standard Provisions (Contract FS-2400-6, USDA Forest Service 2006)</p>
TSHR-3	Require commercial haulers to perform maintenance commensurate with their use; depositing sufficient funds with the Forest Service may be used in lieu of performance. Surface rock replacement deposits will be collected to maintain currently surfaced roads that are used for timber hauling. Deposits will be collected commensurate with the use. Quarry materials will be collected from a site that has been found to be free of invasive plants.	FSM 7732.03
TSHR-4	Timber hauling operations will be restricted during wet or thawed conditions, when needed to protect the road surface. When logging occurs over snow or frozen ground, standard Forest Service practices will be followed.	USDA Forest Service, 2012. FS National BMPs; Treatment- specific design
TSHR-5	Safety signing will be used to alert the public that logging operations are in progress and would meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD).	Timber Sale Contract Standard Provisions (Contract FS-2400-6, USDA Forest Service 2006); FSM 7160
TSHR-6	Use of private roads, encroachment of public roads and rights-of-way, and other access needs outside Forest Service jurisdiction shall have the proper approval or authorization in place prior to use.	16 U.S.C. 572; treatment-specific design
TSHR-7	Use suitable road surface stabilization practices and dust abatement supplements on roads where road surface conditions, traffic use and proximity to recreation or public occupancy justify the need. (See FSH 7709.56 and FSH 7709.59).	USDA Forest Service, 2012.
TSHR-8	Move snow in a manner that will avoid or minimize disturbance of or damage to road surfaces and drainage structures. Use existing standard contract language (C5.316# or similar) for snow removal during winter logging operations to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.	USDA Forest Service, 2012
TSHR-9	<p>Use the following measures to conserve water when managing roads for SBEADMR:</p> <ul style="list-style-type: none"> • Locate new roads with consideration of key topographic factors important to road maintenance, including steepness of slope, position on slope, aspect and drainage pattern. • When possible, schedule road maintenance activities to coincide with higher moisture content for ease of grading and better compaction. • Minimize new road widths to provide for safe use while limiting impermeable surfaces. • Keep ditches open, but do not remove vegetation that does not impede drainage. Vegetation holds the soil in place and reduces sediment loading which is the greater problem. • When installing drainage features, return intercepted runoff to its natural path at the first opportunity. • To avoid clogging, keep the grade of drainage features steeper than the roadway. 	Zeedyk, W. Water Harvesting from Low-Standard Rural Roads. 2006.

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	In general, avoid stream crossings. Where necessary, align the roadway to fit the stream. Avoid road capture of the channel, which can result in the stream diverting down the road – causing severe erosion. Do not constrict and accelerate flows, which can erode the channel.	
<p>Water Quality and Soil Productivity</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. Manage treatments to maintain ground cover to prevent harmful increases in runoff. 2. In the Water Influence Zone (WIZ) next to perennial & intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition 3. Design and construct all stream crossings and other in-stream structures to provide for passage of flow and sediment, withstand expected flood flows, and to allow free movement of resident aquatic life. 4. Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological functions. 5. Limit roads and other disturbed sites to the minimum feasible number, width, and total length. 6. Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, & wetlands. 7. Stabilize and maintain roads and other disturbed sites during and after construction to control erosion. 8. Reclaim roads, landings and other disturbed sites when use ends, as needed, to prevent resource damage. 9. Manage land treatments to limit the sum of severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area. <p>The following design features to protect watershed resources are based on, and structured according to the Region 2 Watershed Conservation Practices Handbook. They address conditions or circumstances that have occurred on recent GMUG NF timber sales. Additional BMPs in the R2 Handbook or National Handbook may apply within future treatment areas as determined during treatment-specific assessments. The various measures may be achieved through avoidance, on-the-ground marking, appropriate contract provisions, identification on the sale or service area map, and/or during sale or contract administration.</p> <p>Treatment-specific soils, hydrologic, and watershed condition assessments will be performed prior to any on-site work (see Appendix C). Treatment-specific design features will be selected based on treatment tasks and the results of treatment-specific assessments.</p>		
WQSP-1	<p>A. Maintain the organic ground cover of each activity area so that pedestals, rills, and surface runoff from the activity area are not increased. The amount of organic ground cover needed will vary by different ecological types and should be commensurate with the potential of the site.</p> <p>B. Restore the organic ground cover of degraded activity areas within the next plan period, using certified local native plants as practicable; avoid persistent or invasive weeds. Also see IW-3.</p>	USDA Forest Service 2006

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WQSP-2	A. The minimum horizontal width of the Water Influence Zone for various water related features is as follows:			USDA Forest Service 2006, Management Prescription 09A in 1991 Forest Plan, and treatment-specific design
	Feature	Outside Edge of WIZ	No Harvest or Mechanical Travel Zone	
	Fens and their associated wetlands	100 ft minimum from edge of fen	100 ft from edge of fen	
	Perennial Streams	100 ft. from stream bank	50 ft from stream bank	
	Intermittent Streams, Reservoirs and Ponds	50 ft. from bank or high water line	25 ft from bank or high water line	
	Wetlands ≥ ¼ acre	100 ft. from edge of wetland	50 ft from edge of wetland	
	Springs/Seeps/Wetlands/ depression recharge areas < ¼ acre	50 ft. from the source or edge of associated wetland, whichever is greater	25 ft from the source of edge of associated wetland, whichever is greater	
	Ephemeral Streams and Swales	25 ft from the channel or topographic low		
	Ditch	Edge of Right of Way		
	B. Keep heavy equipment out of streams, swales, and lakes, except to cross at designated points, build crossings, or do restoration work, or if protected by at least 1 foot of packed snow or 4 inches of frozen soil. Keep heavy equipment out of streams during fish spawning, incubation, and emergence periods.			
C. Ensure at least one-end log suspension in the WIZ. Fell trees in a way that protects vegetation in the WIZ from damage. Keep log landings and skid trails out of the WIZ, including swales.				
D. Locate new concentrated-use sites outside the WIZ if practicable and outside riparian areas and wetlands. Armor or reclaim existing sites in the WIZ to prevent detrimental soil and bank erosion.				
E. Do not excavate earth material from, or store excavated earth material in, any stream, swale, lake, wetland, or WIZ.				
F. Maintain at least 80 percent of potential ground cover within the WIZ				
G. Burn piles may be located within the outer half of WIZs but must not cover more than 15% of the ground.				
H. Avoid direct ignition of prescribed fire within WIZs. Prescribed fire may be allowed to back in to these areas.				
WQSP-3A	A. As required, obtain Corps of Engineers (COE) and State permits when installing stream crossings and ensure they meet permit requirements. In most cases, installation of stream crossing are exempt from COE or State permits as long as BMPs at 33 CFR 323.4 are followed (FSH 2509.25 Section 01.1 – Key Laws).			USDA Forest Service 2006

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	<p>B. Size culverts and bridges to pass debris. Engineers work with hydrologists and aquatic biologists on site design.</p> <p>C. Install stream crossings that will be in place for more than one season in a manner that to sustains bankfull dimensions of width, depth, and slope and keep streambeds and banks resilient. Favor bridges, bottomless arches or buried pipe-arches for those streams with identifiable flood plains and elevated road prisms, instead of pipe. Favor armored fords for those streams where vehicle traffic is either seasonal or temporary, or the ford design maintains the channel pattern, profile and dimension.</p>	
WQSP-3B	Where access across the WIZ must be provided by temporary roads, they will be completely decommissioned by obliteration within 5-years of sale closure. Obliteration at crossings will include the removal of culverts & fill material, the re-contouring of stream banks to the original landform shape, and seeding & mulching of the disturbed surfaces. The remaining prism within the WIZ shall be de-compacted, seeded, and mulched.	Management Prescription 09A, 1991 Forest Plan, and treatment-specific design
WQSP-4	<p>A. Keep ground vehicles out of wetlands. Do not disrupt water supply or drainage patterns into wetlands.</p> <p>B. Keep roads and trails out of wetlands. Avoid actions that may dewater or reduce water budgets in wetlands.</p> <p>C. Avoid any loss of rare wetlands such as fens and springs.</p> <p>D. Do not build fire lines in or around wetlands unless needed to protect life, property, or wetlands. Use hand lines with minimum feasible soil disturbance. Use wetland features as firelines if practicable.</p>	USDA Forest Service 2006, Executive Order 11990, and treatment-specific design
WQSP-5A	Manage land treatments to limit the sum of severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area.	USDA Forest Service 2006.
WQSP-5B	<p>A. With the exception of general road grading, avoid soil-disturbing actions during periods of heavy rain or wet soils. Apply travel restrictions to protect soil and water.</p> <p>B. Install cross-drains to disperse runoff into filter strips and minimize connected disturbed areas. Make cuts, fills, and road surfaces strongly resistant to erosion between each stream crossing and at least the nearest cross drain. Revegetate using certified local native plants as practicable; avoid persistent or invasive weeds.</p> <p>C. Use existing roads unless other options will produce less long-term sediment. Reconstruct for long-term soil and drainage stability.</p> <p>D. Avoid ground skidding on sustained slopes steeper than 40% and on moderate to severely burned sustained slopes greater than 30%. Conduct logging to disperse runoff as practicable.</p> <p>E. Locate and construct log landings in such a way to minimize the amount of excavation needed and to reduce the potential for soil erosion. Design landings to have proper drainage. After use, treat landings to disperse runoff and prevent surface erosion and encourage revegetation.</p>	USDA Forest Service 2006 and treatment-specific design
WQSP-6	<p>A. Design all roads, trails, and other soil disturbances to the minimum standard for their use and to "roll" with the terrain as feasible.</p> <p>B. Use filter strips, and sediment traps if needed, to keep all sand-sized sediment on the land and disconnect disturbed soil from streams, lakes, and wetlands. Disperse runoff into filter strips.</p>	USDA Forest Service 2006 and treatment-specific design
WQSP-7A	<p>A. Do not encroach fills or introduce soil into streams, swales, lakes, or wetlands.</p> <p>B. Space cross drains according to road grade and soil type as indicated in WQSP – 7B. Do not divert water from one stream to another.</p>	USDA Forest Service 2006 and treatment-specific design

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	<p>C. Empty cross drains onto stable slopes that disperse runoff into filter strips. On soils that may gully, armor outlets to disperse runoff. Tighten cross-drain spacing so gullies are not created.</p> <p>D. Where berms must be used, construct and maintain them to protect the road surface, drainage features, and slope integrity while also providing user safety.</p>	
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WQSP-7B

A. Skid trail locations will be agreed to by the Forest Service in advance of construction; spacing will be approximately 100 feet apart, allowing for topographic variation and skid trail convergence. Space water bars as appropriate on skid trails according to slope and soil type as indicated below:

USDA Forest Service 2006, ASTM D-2487, and treatment-specific design

Unified Soil Classification - ASTM D 2487 ¹				
Slope (%)	ML, SM <u>Extremely Erodible Silts &sands with little or no binder (i.e. decomposed granite)</u>	MH, SC, CL <u>Highly Erodible Silts & sands with moderate binder</u>	SW, SP, GM, GC <u>Moderately Erodible Gravels + fines & sands with little or no fines</u>	GW, GP <u>Slightly Erodible Gravels with little or no fines</u>
1-3	200	300	400	500
4-6	125	200	300	400
7-9	100	150	200	250
10-12	70	100	150	200
13-25	50	50	75	100
25+	30-50	30-50	60-75	80-100

¹ American Society for Testing Materials, standard classification of soil for engineering purposes.

B. Space cross drains and rolling dips as appropriate on temporary roads according to road grade and soil type as described in FSH 2509.25 table 13.3 – Exhibit 01, Maximum Cross-Drain Spacing in Feet Based on Soil Types.

Unified Soil Classification - ASTM D 2487 ¹				
Slope (%)	ML, SM <u>Extremely Erodible Silts &sands with little or no binder (i.e. decomposed granite)</u>	MH, SC, CL <u>Highly Erodible Silts & sands with moderate binder</u>	SW, SP, GM, GC <u>Moderately Erodible Gravels + fines & sands with little or no fines</u>	GW, GP <u>Slightly Erodible Gravels with little or no fines</u>
1-3	600	1000	1000	1000
4-6	300	540	680	1000
7-9	200	360	450	670
10-12	150	270	340	510
13-25	120	220	270	410

¹ American Society for Testing Materials, standard classification of soil for engineering purposes.

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WQSP-8A	<p>A. Site-prepare, drain, de-compact soils, revegetate, and close landings, main skid trails, and temporary and intermittent use roads and other disturbed sites within 5 years of the end of sale closure. Provide stable drainage that disperses runoff into filter strips and maintains stable fills. Do this work concurrently. Stockpile topsoil where practicable to be used in site restoration. Revegetate using certified local native plants as practicable; avoid persistent or invasive exotic plants.</p> <p>B. Remove all temporary stream crossings (including all fill material in the active channel), restore the channel geometry, and revegetate the channel banks using certified local native plants as practicable.</p> <p>C. Restore cuts and fills to the original slope contours where practicable and as opportunities arise to re-establish subsurface pathways. Use certified local native plants as practicable; avoid persistent or invasive weeds. Obtain storm water (402) discharge permits as required.</p>	USDA Forest Service 2006 and treatment-specific design
WQSP-8B	<p>In decommissioning roads,</p> <p>A. Implement suitable measures to close and physically block the road entrance so that unauthorized motorized vehicles cannot access the road.</p> <p>B. Establish effective ground cover (i.e. erosion control measures and revegetation) on disturbed sites to avoid or minimize accelerated erosion and soil loss.</p> <p>C. Evaluate risks to soil, water quality, and riparian resources and use the most practicable, cost-effective treatment to achieve long-term desired conditions and water quality management goals and objectives.</p> <p>D. Use applicable practices of BMP Fac-2 (Facility Construction and Storm water Control) for Storm water management and erosion control when obliterating designed roads.</p> <p>E. Implement suitable measures to re-establish stable slope contours and surface and subsurface hydrologic pathways where necessary to the extent practicable to avoid or minimize adverse effects to soil, water quality, and riparian resources.</p> <p>F. Remove drainage structures.</p> <p>G. Re-contour and stabilize cut slopes and fill material when needed..</p> <p>H. Reshape the channel and streambanks at crossing sites to pass expected flows without scouring or ponding, minimize potential for undercutting or slumping of streambanks, and maintain continuation of channel dimensions and longitudinal profile through the crossing site.</p> <p>I. Restore or replace streambed materials to a particle size distribution suitable for the site.</p> <p>J. Restore floodplain function if impaired by treatment operations.</p> <p>K. Implement suitable measures to promote infiltration of runoff and intercepted flow and desired vegetation growth on the road prism and other compacted areas.</p> <p>L. Use suitable measures in compliance with local direction to prevent and control invasive weeds (also see IW-1 to IW-6)</p>	USDA Forest Service 2012
WQSP-9A	<p>A. Restrict roads, landings, skid trails, concentrated-use sites, and similar soil disturbances to designated sites.</p> <p>B. Operate heavy equipment for land treatments only when soil moisture is below the plastic limit, or protected by at least 1 foot of packed snow or 4 inches of frozen soil.</p> <p>C. Conduct prescribed fires to minimize the residence time on the soil while meeting the burn objectives. This is usually done when the soil and duff are moist.</p>	USDA Forest Service 2006, FSH 2509.18, Soil Management Handbook, 1992, and treatment-specific design

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WQSP-9B	Fire lines and fuel breaks should utilize existing roads, skid trails, natural features, and use of wet lines as much as possible to minimize impacts caused by new line construction.	<i>Treatment-specific design</i>
WQSP-9C	The total length and width of constructed lines should be minimized. Blading to expose bare mineral soil displaces the nutrient and organic matter enriched surface horizon and increases the risk of erosion and spread of invasive weeds.	<i>Treatment-specific design</i>
WQSP-9D	Avoid dozer line construction on slopes greater than 30%.	<i>Treatment-specific design</i>
WQSP-9E	After use, pull soil and litter back into the fire line, seed, and top scatter slash if available. Where fire lines create cut slopes re-contour by pulling side cast or fill material back, seed, and top scatter slash if available immediately after use.	<i>Treatment-specific design</i>
WQSP-9F	Avoid direct ignition of concentrated areas of dry masticated materials greater than 2” in depth. Prescribed fire may be allowed to burn into these areas.	<i>Treatment-specific design</i>
WQSP-10	To ensure HUC12 disturbance is less than 25 percent, maintain disturbances from mechanical harvest treatments and roads to less than 25 percent of the HUC12 area. Other natural events (wildfire) could also affect watershed integrity. Weighted acres of mechanical harvest, road construction or other anthropogenic or natural disturbances within the watershed will be tracked in order to ensure cumulative impacts of SBEADMR, other related actions and wildfire remain below this 25% cap. If 20% of the HUC12 is affected, discontinue or reduce acres of treatment in watershed so 25% threshold not exceeded. If 25% of the watershed is affected, discontinue treatments in suitable watershed until recovery has occurred. Also a Decision-Making Trigger for Adaptive Management, Chapter 2.	LRMP, Watershed Conservation Practices Handbook.
Wildlife, Fish and Rare Plants Objectives: <ol style="list-style-type: none"> 1. Design treatments to meet applicable objectives and standards with the Southern Rockies Lynx Amendment (SRLA). Consider guidelines outlined in the SRLA in treatment planning. When guidelines cannot be met, provide rationale to Fish and Wildlife Service (FWS) in year-end reporting. 2. Design treatments to meet applicable Forest Plan standards and guidelines related to wildlife. 3. Complete annual reporting to FWS as required by the SRLA. 4. Seek opportunities to integrate wildlife habitat management objectives as part of treatment activities. 5. Design treatments to meet Gunnison sage-grouse habitat objectives from the Range-wide Plan. 		
WFRP-1	All applicable management Objectives, Standards and Guidelines contained in the Southern Rockies Lynx Amendment will be applied during treatment planning and implementation.	USDA Forest Service, Rocky Mountain Region, 2008. (SRLA)
WFRP-2	At a minimum, in spruce-fir forest types maintain 90 to 225 snags per 100 acres, 10 inches in diameter at breast height (dbh) or greater (where biologically feasible). In aspen forest types, maintain 120 – 180 snags per 100 acres, 8 inches dbh or greater (where biologically feasible). Snags would be maintained away from structures, roads and trails so that they do not create safety hazards to the public. Where possible, utilize natural sinuosity or drainages for linking groups. Protect standing wildlife trees from damage during site preparation and post-sale activities.	GMUG Forest Plan Standards and Guidelines
WFRP-3	Where feasible, maintain a minimum of 10-20 tons per acre of coarse woody debris within harvest units. Where possible in regeneration units, create piles of logs, stumps, or other woody debris to minimize the effects of larger openings.	GMUG Forest Plan Standards and Guidelines

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WFRP-4	Maintain large diameter downed logs in various stages of decomposition within harvest units (50 linear feet/acre of 10 inches diameter or larger at the large end of lodgepole pine and aspen logs and/or 12 inches diameter or larger for Engelmann spruce, subalpine fir and Douglas fir logs).	GMUG Forest Plan Standards and Guidelines
WFRP-5	<p>In forested areas where salvage, resiliency, combination, prescribed burn and mechanical treatments are implemented, strive to maintain forested cover on 60% or more of the perimeter of all natural and created openings, and along at least 60% of each NFS Road (level 5 and below) that has high levels of human use during the time deer and elk would be expected to inhabit an area. Roads with restricted use could provide for less cover. Except where natural openings or parks exist along roads and when applying hazard tree removal activities along roads to meet public safety goals, gaps along roads should not exceed ¼ mile. Cover should be well-distributed across the landscape. Minimum sizes for hiding and thermal cover patches are 2 -5 acres for mule deer, and 30 – 60 acres for elk. Hiding and thermal cover may be the same in many cases.</p> <p>The intent is to maintain or improve habitat diversity and make or keep the area in a condition where deer and elk can effectively use the area by managing the vegetation and human activity. This design feature provides an opportunity to implement the proposed commercial and noncommercial activities in a way that accomplishes these wildlife habitat objectives while also meeting the purpose and need of the project. District wildlife, timber and fire programs will coordinate closely during the planning and design phase of projects to accomplish these objectives.</p>	Direction for maintaining habitat connectivity at the landscape scale, and to retain hiding and thermal cover for big game; GMUG Forest Plan (Page III-28, General Direction 01, Standard and Guideline a and b)
WFRP-6	Provide hiding cover within 1,000 feet of any known elk calving areas. The District wildlife biologist will be responsible for coordinating with Colorado Parks and Wildlife to identify calving areas and informing timber and fire staff on locations. When calving areas are identified, a 1,000 foot buffer will be applied and existing vegetation conditions within the buffer will be assessed by the District biologist to determine cover needs, identify areas to avoid with treatments, or coordinate with timber and fire staff to determine how treatments could be designed to maintain or enhance cover.	GMUG Forest Plan (Page III-24, General Direction 01, Standard and Guideline a)
WFRP-7	Northern goshawk - No activities will be allowed within ½ mile of active nests from March 1 to August 31, with the exception that on roads open to other traffic, log hauling will be allowed. The timing restriction buffer could be reduced to ¼ mile if topographic features and/or adequate screening cover are present that would protect the nest site from disturbance. No harvest activities will be allowed within a 30-acre buffer of nest sites. Outside of a 30-acre area around goshawk nest sites, timing restrictions are not needed for treatment layout, marking, and any other activities that are non-disturbing (i.e., activities not involving the use of heavy equipment or chainsaws). Timing restrictions will only apply to active nests, as confirmed by the GMUG National Forests' wildlife biologist. The District wildlife biologist will keep the timber and fire staff informed on nest status and locations.	Colorado Parks and Wildlife Raptor Buffer and Timing Restriction Recommendations; GMUG Forest Plan Standards and Guidelines
WFRP-8	Northern goshawk – provide or leave 20% of pole or mature tree stands adjacent to nesting sites with at least 150 square feet of basal area. Provide or leave at least one class 1 log adjacent to nest sites. The District wildlife biologist will be responsible for coordinating with timber and fire staff on nest locations and assessing vegetation conditions adjacent to nest sites.	GMUG Forest Plan (Page III-24, General Direction 01, Standard and Guideline e)
WFRP-9	On-going surveys for raptors would be conducted to determine locations of individuals or populations of these species and allow for the implementation of protection measures using the appropriate buffer or timing restriction.	Treatment- specific design; Migratory Bird Treaty Act
WFRP-10	Retain live trees in salvage units, except for trees that need to be removed for operational/safety or silvicultural purposes. Operational/safety or silvicultural purposes include the need to remove live trees if necessary to access dead trees for salvage or to address safety concerns.	Treatment- Specific Design

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WFRP-11	Skid trails and landings will be located to minimize impacts to advanced regeneration. Skid trails should be placed at least 100 feet apart, except where they converge at landings.	Treatment- Specific Design
WFRP-12	Areas supporting live advanced regeneration with >35% Dense Horizontal Cover in blocks greater than 0.3 acres will be avoided to the extent possible during layout [and during harvest operations], while allowing feasible operations..	SRLA – VEG S6 Standard
WFRP-13 and WQSP-5A.	Landings and main skid trails should be evaluated to determine if detrimental soil compaction has occurred. Based on review by a specialist, when detrimental compaction is found, subsoil ripping may be applied to reduce soil impacts. When a site prep contract is necessary, this provides the opportunity to rip skid trails and landings in the area and potentially in nearby adjacent areas. This would provide for a more suitable seedbed for future regeneration, thus preventing permanent impacts of skid trails that when left in a compacted state, often do not regenerate as well as adjacent un-compacted areas. Importantly, all operations will conform to the direction in Chapter 10 of the Water Conservation Practices Handbook including managing treatments to limit the sum of severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area.	Treatment- Specific Design to address impacts and recovery of snowshoe hare and lynx habitat (SRLA); Water Conservation Practices Handbook, FSH 2509.25, Chapter 10
WFRP - 14	Surveys for threatened, endangered, and sensitive (TES) species will occur prior to design of a treatment. However, since it may take several years to fully implement a treatment, some level of TES re-survey will occur on an annual basis. If TES species are confirmed present, applicable design features identified in this table will be applied to ensure consistency with the Forest Plan, Endangered Species Act, and Forest Service Sensitive Species Policy. Once a project is in the implementation phase, if TES species are confirmed present during operations the District wildlife biologist will be consulted and the appropriate standards for the Forest Plan will be applied (timing restrictions, buffer of nest sites, identify no cut area around nest sites, etc.). For example, if a new goshawk nest is found during operations, operations will stop; the District biologist will be informed and will evaluate the situation to determine if adverse impacts are occurring. This may include establishing an avoidance area around the occupied habitat or nest site consistent with Forest Plan direction and best available science to avoid impacts that could lead to nest abandonment and/or mortality.	Treatment- Specific Design; Endangered Species Act; Forest Service Sensitive Species Policy; Migratory Bird Treaty Act.
WFRP-15	Winter logging is encouraged to limit direct disturbance to the fewest number of wildlife species as possible. When possible, avoid treatment activities in areas where big game (elk, deer, pronghorn and moose) are known to occur. When big-game winter range is bisected by proposed haul routes and there are concentrations of animals along these routes minimize stress to wintering animals to the extent practicable by: A. Re-routing along another acceptable route. B. From December 1 to April 15, restrict haul times to between 9 am and 4 pm, unless otherwise agreed to in writing by the Forest Service. The district biologist will coordinate with Colorado Parks and Wildlife to assess big game use and identify areas where animals concentrate during winter, and assess if there is a need to implement conservation measures. This would be a coordinated effort with the GMUG, Colorado Parks and Wildlife, timber purchaser, and contracting officer. When the need arises to protect concentrations of wintering big game, the District wildlife biologist will be responsible for providing the timber staff with maps of these areas.	GMUG Forest Plan General Direction 04, 05c. and 05f. (page III-76 – II-77)
WFRP-16	Gunnison sage-grouse – Portions of haul routes may occur in occupied habitat in few areas. Where use of haul routes have the potential to impact Gunnison sage-grouse as determined by the District wildlife biologist, timing restrictions should be applied that prohibit the use of haul routes that occur within 0.6 mi of active leks (breeding sites) from March 15 – May 15. Haul routes that are open to the public year-round would be excluded from this design feature (this applies to main roads such as State and	Gunnison Sage-Grouse Range-wide Conservation Plan; Endangered Species Act; Nov. 20, 2014 final

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	U.S. highways and certain county roads). Noncommercial treatments at lower elevations have the potential to incidentally affect sagebrush habitat. Avoid areas of sagebrush habitat. The District wildlife biologist will be responsible for coordinating with Colorado Parks and Wildlife to verify annual lek status and for coordinating with timber and fire staff on locations of sage-grouse habitat avoidance areas.	listing decision and critical habitat designation- FR79 No.224 Part II and Part III.
WFRP-17	Habitat connectivity will be maintained at the landscape scale (Lynx Analysis Unit and Linkage zones for lynx) through various methods depending on treatment type, location and overall condition of each Lynx Analysis Unit. Methods may include a combination of variable retention regeneration harvest methods through resiliency treatment types; tree retention areas of various sizes and shapes to retain snag groups and protect live understory trees across the landscape, with emphasis on multi-storied forest stands and areas typically used by wildlife as travel corridors (ridges, saddles, stream corridors); protection of water influence zones and stringers of timber; and maintaining areas of high quality snowshoe hare habitat as determined from dense horizontal cover field surveys using an established scientific protocol (cover board protocol). In terms of habitat connectivity considerations and to meet the Southern Rockies Lynx Amendment direction, there will be a lot of focus on protecting areas with high quality dense horizontal cover in multi-storied stands and managing vegetation at the landscape-scale toward Potential Natural Vegetation (PNV). On a timber sale by timber sale basis, coordination will occur between the District wildlife biologist and the timber staff to determine the appropriate method for accomplishing habitat connectivity goals, including determining the appropriate size, shape, and location of tree retention areas.”	Treatment- specific design intended to support consistency with SRLA direction for lynx habitat connectivity. Interagency Lynx Biology Team, 2013.
WFRP - 18	To maintain the amount and distribution of lynx foraging habitat over time capable of supporting lynx at the LAU scale, manage so that no more than 30% of the lynx habitat in an LAU is in an early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30% of the lynx habitat in an LAU is in early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (e.g., clear-cuts, seed tree harvest, pre-commercial thinning, or understory removal), no further increase as a result of vegetation management treatments should occur on federal lands. Acres affected by lynx analysis unit through 2015 are available in the treatment analysis file. As management occur in the affected LAU over the life of the treatment, acres affected will be tracked by the District wildlife biologist and Forest wildlife program lead to ensure consistency with this conservation measure.	SRLA; Interagency Lynx Biology Team. 2013
WFRP-19	American (Pine) Marten – Research has shown that martens avoid openings created from vegetation management activities that completely remove all trees (structural stand initiation stage) if the openings are larger than 300 feet in width. In areas identified as multi-storied spruce-fir, openings created should be less than 300 feet in width unless suitable marten habitat is maintained within cutting units through snag, advanced regeneration, and coarse woody debris retention as described in the above design features. Cutting units of this size will only occur when salvage prescription are applied and will be subject to WFRP-12. Exception: areas where public safety is a concern (road corridors, around structures, etc.). Commercial treatments will target dead trees larger than eight inches in diameter so some residual cover will remain within cutting units. Irregular-shaped harvest units are desirable.	GMUG Forest Plan (Page III-24, General Direction 01, Standard and Guideline b)

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WFRP-20	Within secondary habitat for lynx (300 foot buffer from primary habitat) retain spruce and fir in aspen-spruce mix stands. Primary habitat is defined as having a dominance of spruce-fir cover type. Most of the secondary habitat includes either pure aspen or aspen-spruce mixed stands.	USDA Forest Service, 2008 - Southern Rockies Lynx Amendment.
WFRP-21	When planning non-commercial treatments in critical habitat for Gunnison sage grouse, avoid direct treatment to sagebrush. Any treatment in designated critical habitat will be planned in coordination with the District Biologist.	Gunnison Sage-grouse Range-wide Steering Committee. 2005.
WFRP- 22	When planning treatments in mature aspen, complete inventories for purple martin and avoid these areas if birds are detected. In Colorado, habitat preference seems very specific: edges of mature aspen stands, usually near a stream, spring or pond	Colorado Breeding Bird Atlas, 1998.
WFRP-23	In LAU with extensive mortality of mid-late and late seral spruce (Habitat Structural Stages 4A, 4B and 4C), retain these live stands to the greatest extent practicable during treatment design.	SRLA
WFRP - 24	To minimize spread of Amphibian Chytrid Fungus, at least one member of the Aquatics Team will participate in the planning and implementation of project-level operations. See also IW-2 for equipment washing requirements.	Johnson & Speare, 2003; Johnson et al., 2003
WFRP - 25	In areas where Boreal Toad is known to exist, the timing of ground-based activities may be limited by the season. Boreal Toads forage up to 1.6 miles from breeding sites (pond) between July and late October. Ground-based operations of commercial or non-commercial equipment will be limited in these areas to when there is at least 4 inches of frozen soil or snow to the extent practicable. Under current known toad distribution, WFRP-25 would only apply to the Cement Creek commercial PTA.	Bartelt et al. 2004
WFRP - 26	Where non-commercial fuel reduction treatments could overlap with occurrence of Boreal Toad, there will be no mechanical operations (i.e. mastication, etc.). In these areas pile burning will be used to reduce fuels while concurrently minimizing ground disturbance, the possibility of indirect toad mortality and reduction or loss of hibernaculum habitat. Under current known toad distribution, WFRP-25 would only apply to the Buzzard Creek non-commercial PTA.	Bartelt et al. 2004

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